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Policy issues for information and communications technology: promoting the integration and application of information and communications technology policy through the Asia-Pacific Information Superhighway initiative

Master Plan for the Asia-Pacific Information Superhighway, 2019–2022

Note by the secretariat

Summary

In accordance with resolution 71/10 of the Economic and Social Commission for Asia and the Pacific (ESCAP), the 1st meeting of the Working Group on the Asia-Pacific Information Superhighway was held in Incheon, Republic of Korea, in September 2015. At that meeting, it was agreed that a master plan on the Asia-Pacific Information Superhighway and a regional cooperation framework document would be developed and that they would be mutually reinforcing. The Asia-Pacific Information Superhighway Steering Group was formed to carry out that task. The Master Plan for the Asia-Pacific Information Superhighway was developed based on studies and analyses carried out by ESCAP in the region, consultations with various stakeholders, including representatives of the private sector in April 2016, and discussions at a technical meeting organized in March 2016. The Master Plan contains key strategic initiatives, targeted goals and a timeline in line with the four pillars of the Asia-Pacific Information Superhighway initiative: strengthening the regional broadband infrastructure; establishing regional Internet traffic and network management systems and policies; enhancing information and communications technology infrastructure resilience; and providing inclusive access to broadband Internet. The Master Plan was subsequently endorsed at the 2nd meeting of the Working Group on the Asia-Pacific Information Superhighway, which was held in Guangzhou, China, on 29 and 30 August 2016 and first session of the Committee on Information and Communications Technology, Science, Technology and Innovation, on 5–7 October 2016.

In 2017, the Commission at its 73rd session endorsed the Master Plan (E/ESCAP/CICTSTI(1)/2) and Regional Cooperation Framework Document (E/ESCAP/CICTSTI(1)/3) for the Asia-Pacific Information Superhighway and adopted a resolution [1] which invited member countries to cooperate in the implementation of the Master Plan and Regional Cooperation Framework Document. Subsequently, the first session of the Asia-Pacific Information

* ESCAP/CICTSTI/2018//L.1/Rev.1

[1] www.unescap.org/commission/73/document/E73_RES6E.pdf.

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Superhighway Steering Committee discussed, among others, future activities of the Master Plan and Regional Cooperation Framework Document beyond 2018 drawing from the implemented activities and governance structure.

Against this background, the current document presents the Master Plan for the Asia-Pacific Information Superhighway, 2019–2022 for consideration of the second session of the Committee on Information and Communications Technology, Science, Technology and Innovation.

I. Introduction

1. In the developing region of Asia and the Pacific, less than 15 per cent of the population has access to high-speed Internet, and the situation in the least developed countries has not improved during the last 15 years according to the latest report of the Economic and Social Commission for Asia and the Pacific (ESCAP).[2] To address this issue, ESCAP, in its resolution 71/10, endorsed continued work on the Asia-Pacific Information Superhighway initiative. The initiative aims to improve regional broadband connectivity through a dense web of open access cross-border infrastructure that will be integrated into a cohesive land- and sea-based fibre network with the ultimate aims of increasing international bandwidth for developing countries in the region, lowering broadband Internet prices and bridging the digital divide in the region.

2. The Asia-Pacific Information Superhighway initiative complements the commitment of ESCAP member countries to General Assembly resolution 70/125 on the outcome document of the high-level meeting of the General Assembly on the overall review of the implementation of the outcomes of the World Summit on the Information Society, in which the Assembly recognized the urgent need to harness the potential of knowledge and technology for the promotion of the Sustainable Development Goals and the need to find ways to use this potential for development. In 2015, the Commission, in its resolution 71/10, requested the secretariat to promote the sharing of experiences, good practices and lessons learned in information and communications technology (ICT) for disaster risk reduction, management and response and building e-resilience and endorsed the establishment of the Working Group on the Asia-Pacific Information Superhighway. Its 1st meeting was held in Incheon, Republic of Korea, on 1 and 2 September, 2015. It decided to:

(a) Draft a master plan encompassing a long-term vision, targeted goals, specific activities and milestones with regard to the four pillars of the Asia-Pacific Information Superhighway initiative;[3]

(b) Draft a regional cooperation framework for the Asia-Pacific Information Superhighway initiative consisting of the four pillars.

3. The Working Group on the Asia-Pacific Information Superhighway also established the Asia-Pacific Information Superhighway Steering Group, consisting of the members of the Bureau of the Working Group and multi-stakeholder representatives with policy and technical expertise. The primary

[2] United Nations, Economic and Social Commission for Asia and the Pacific, "State of ICT in Asia and the Pacific 2016", Working Paper (forthcoming).

[3] Strengthening the regional broadband infrastructure; establishing regional internet traffic and network management systems and policies; enhancing ICT infrastructure resilience; and providing inclusive access to broadband internet.

objective of the Steering Group was to draft a master plan for the Asia-Pacific Information Superhighway and a regional cooperation framework document.

4. In support of the Asia-Pacific Information Superhighway initiative, and to create the Master Plan for the Asia-Pacific Information Superhighway, ESCAP carried out a number of analyses and feasibility studies on the existing and missing terrestrial links and estimated demand for broadband services, e-resilience and Internet traffic management in South and West Asia, Central Asia and countries of the Association of Southeast Asian Nations (ASEAN).[4] The studies and analyses were carried out in collaboration with other agencies, such as the National Information Society Agency of the Republic of Korea, the Asian Development Bank, LIRNEasia and the Internet Society. These studies were primarily focused on, but not limited to, the status of broadband adoption, fixed and mobile broadband infrastructure, pricing, domestic fibre-optic networks (terrestrial and interregional terrestrial) and international connectivity. With the International Telecommunication Union, ESCAP updates their collaborative broadband network maps.[5]

5. As drafted, the Master Plan requires the institutionalization of an Asia-Pacific Information Superhighway governance structure to ensure its effective implementation. The secretariat of the Commission, through intergovernmental processes, will ensure coordination, reporting and support. The Master Plan is intended to add value to the subregional initiatives, such as the ASEAN ICT Master Plan, and other initiatives, including member States' national ICT plans and initiatives.

6. The Master Plan for the Asia-Pacific Information Superhighway proposes the establishment of network corridors with the aim of achieving an efficient and effective physical network consisting of both terrestrial cross-border connections and submarine cable landing stations to realize a seamless Asia-Pacific regional information and communication network.

II. Highlights of the Commission's findings

7. Access to international connectivity or transit is largely dominated by submarine cable landings in the Asia-Pacific region. The Commission's analysis of the terrestrial network has shown that many countries in the region have backhaul domestic infrastructure networks that are poorly meshed and follow a "river system" pattern. Furthermore, the limited number of fibre interconnections across countries also limits the availability of total and per capita international bandwidth. This has affected the landlocked countries in particular, which do not have direct access to submarine cable landing stations and have to rely on limited terrestrial cross-border connections.

8. To date, ESCAP has conducted a number of studies in three subregions: South and West Asia, Central Asia and the ASEAN region. The findings are summarized below.

A. The state of information and communications technology in the Asia-Pacific region

9. More than 52 per cent of global fixed broadband subscriptions come from ESCAP member countries, followed by European countries (21.9 per cent)

[4] See www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/publications?page=1.

[5] www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/asia-pacific-information-superhighway-maps.

and North American countries (14.1 per cent). Seventy-four per cent of fixed broadband subscriptions in the ESCAP region are in East and North-East Asia, and more than half of the region's fixed broadband subscriptions are driven by China alone. High-income ESCAP countries are more digitally inclusive, while low-income ESCAP members show signs of the digital divide. Fixed broadband growth is spreading to emerging countries, albeit slowly and unevenly.

10. In addition, in the working paper, State of ICT in Asia and the Pacific 2016, a strong correlation between the quality of regulation and fixed broadband penetration was identified. Regarding total mobile broadband subscriptions, phenomenal growth has been observed across emerging economies, which are overtaking advanced countries. However, if weighted by population, it is clear that advanced countries have much higher penetration rates. Researchers analysed the broadband digital divide in ESCAP member countries and found that unless targeted policies are implemented, the digital divide will widen in the coming years.

B. Central Asian countries

11. Central Asia[6] has done relatively well in mobile communications due to improved coverage and the availability of affordable devices. However, there is significant variation in Internet adoption across these 10 countries, with varying penetration rates. This has been attributed primarily to the high cost of Internet services. While most countries in the subregion remain significantly below the global average (10 per cent), Azerbaijan, Georgia and Kazakhstan all have fixed broadband penetration rates above the global average, with Armenia only slightly below. In mobile broadband, Armenia, Azerbaijan, Kazakhstan and Kyrgyzstan all perform well against the global average.

12. However, the Central Asian countries, even taken together as a whole, lack adequate international bandwidth. This is in stark contrast to other subregions, such as the ASEAN region, which has sufficient bandwidth. Furthermore, most of these countries are heavily dependent on their neighbours for access to international bandwidth.

13. The infrastructure connections of these 10 economies with the rest of the world mostly comprise terrestrial landing cables although Pakistan and Georgia have access to submarine cables. These 10 countries are surrounded by the Russian Federation in the north, China in the east, the Islamic Republic of Iran and Pakistan in the south, and Turkey in the west. These neighbouring countries could provide additional international bandwidth terrestrially as well as through submarine cables to the landlocked countries. Furthermore, Central Asia has a number of interconnected terrestrial cable networks running through the subregion, such as the Trans-Asia-Europe line, the Europe-Persian Express Gateway and the Trans-Eurasian Information Superhighway. These cable systems could be tapped for international bandwidth by the landlocked countries. Furthermore, these cable systems present an opportunity for alternative redundant routes to the existing choke points in the current undersea cable system.

14. While broadband penetration is generally low, consumers and businesses across the 10 countries are increasingly accessing the Internet through wireless broadband rather than fixed broadband. This trend is prevalent due to lack of or insufficient fixed line infrastructure, revealing major

[6] For the purposes of the Asia-Pacific Information Superhighway initiative: Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan.

weaknesses in the Central Asian countries. It has also been noted that most of these countries in particular lack the necessary fixed backbone infrastructure required to support the emerging demand for wireless communications.

C. Association of Southeast Asian Nations countries

15. ASEAN countries have made extensive investments in fibre and other broadband infrastructure (domestic as well as international). However, a wide gap in the level of access and services exists among the ASEAN countries. The average Internet speed in ASEAN countries falls below the world average, except in Singapore and Thailand. Cambodia, Indonesia, the Lao People's Democratic Republic, Myanmar and Viet Nam would require additional investments to expand their domestic networks.

16. Observations of the quality of the backbone network and Internet traffic exchange connectivity among ASEAN countries indicate noticeable differences within the subregion. In the worst case, the assessment showed an international backbone trunk line download speed of 0.15 megabits per second, a latency of 230 milliseconds and a tromboning index[7] of 35. In the best case, the assessment showed a download speed of 50.1 megabits, a latency of 7.5 milliseconds and tromboning index of 1. This indicates that the backbone network connectivity and the Internet traffic exchange and management systems in the subregion are significantly inefficient. Broadband penetration in ASEAN is also still very low, with large gaps between countries. It was also noted that there is relatively weak land-based interconnectivity and a high cost or high price structure. The regional Internet transit prices in some countries, such as Cambodia, the Lao People's Democratic Republic, Myanmar and the Philippines, were 10 times more expensive than those in Singapore.

17. International connectivity in most ASEAN countries is relatively weak, except in Malaysia, the Philippines and Singapore. Cambodia relies on backhaul agreements with other neighbouring countries for international connectivity. Indonesia has weak and limited interregional connectivity and strongly depends on Singapore for its transit capacity. The only landlocked country in the ASEAN subregion, the Lao People's Democratic Republic, has no direct connectivity to submarine cable networks.

D. South and West Asian countries

18. An analysis of telecommunications, Internet markets and broadband infrastructure in nine countries in the subregion (Bangladesh, Bhutan, India, the Islamic Republic of Iran, Maldives, Nepal, Pakistan, Sri Lanka and Turkey) revealed a sharp disparity among the countries in terms of bandwidth availability. Such a disparity is detrimental to economic growth, social development and inclusiveness. This weak terrestrial fibre-optic connectivity has been the root cause of the subregion's bandwidth inequality and low capacity, high cost and unreliability.[8] It has led to expensive consumer and

[7] A tromboning index is defined as Internet routing distance/straight line distance from the source to the destination of a packet.

[8] United Nations, Economic and Social Commission for Asia and the Pacific, "An in-depth study on the broadband infrastructure in South and West Asia". Available from www.unescap.org/sites/default/files/Broadband_Infrastructure_South%26West_Asia.pdf.

wholesale pricing of bandwidth and the limited availability and penetration of advanced ICT services and applications, including broadband.[9]

19. Both fixed and mobile broadband infrastructure in the subregion could be significantly expanded. The price of Internet transit varies from very reasonable (Turkey), to moderate (India), to expensive for the rest of the countries in the subregion. With the exception of India and the Islamic Republic of Iran, which enjoy excellent submarine cable-based international connectivity, the international connectivity of the rest of the countries in the subregion varies from sufficient, somewhat weak to weak. Bhutan and Nepal, the two landlocked countries in the subregion, are entirely dependent on India for international submarine connectivity. The competition in the subregion's markets is competitive (India), somewhat competitive (Bangladesh and Pakistan) and less competitive (Bhutan, the Islamic Republic of Iran, Maldives, Nepal, Sri Lanka and Turkey).

E. Status of information and communications technology in the Pacific

20. ESCAP has yet to carry out studies in the Pacific subregion. However, reforms in the telecommunications sector of the Pacific islands have resulted in a major expansion in terms of connectivity through submarine cables. The impact of mobile phones and Internet access has been widespread, with benefits that include better access to health, education, market information, financial services and information at times of natural disasters.[10]

III. Vision and the four pillars

21. As a pillar of regional connectivity, the Asia-Pacific Information Superhighway initiative shall be a catalyst to develop seamless regional broadband networks which improve affordability, reliance, resilience and coverage and thereby address the causes of digital divides, develop the Internet ecosystem to support the implementation of the Sustainable Development Goals, and stimulate the digital economy in Asia and the Pacific.

22. Despite the substantial gains reaped from broadband Internet across all sectors, progress has been uneven across Asia and the Pacific, which remains one of the most digitally divided regions in world. The widening digital divide is a legitimate source of concern. To address this concern, the Asia-Pacific Information Superhighway concept was defined at the 1st meeting of the Working Group on the Asia-Pacific Information Superhighway based on the above-mentioned research and analysis that identified gaps, opportunities and the need for regional cooperation on topics related to the four pillars (figure I):

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[9] Turkey's per capita international Internet bandwidth was more than 30 kilobytes per second, while Bangladesh's was only 0.3 kilobyte per second, a ratio of 100 to 1. Countries such as Bangladesh, India and Nepal (which together account for one fifth of the world's population) have per capita international Internet bandwidth at less than 1 kilobyte per second; bandwidth in the Islamic Republic of Iran, Pakistan and Sri Lanka is also extremely weak, at 2.2 kilobytes per second or less, while, in comparison, the average in Western Europe is approximately 100 kilobytes per second. The annual 1 megabit per second broadband subscription plus installation as a percentage of nominal gross domestic product per capita varies from extremely affordable (Turkey), affordable (Sri Lanka), reasonable (Bhutan, India, the Islamic Republic of Iran and Maldives), somewhat expensive (Pakistan) to very expensive (Bangladesh and Nepal).

[10] Siope Vakataki'Ofa, *Telecommunications Regulatory Reform in Small Island Developing States: The Impact of the WTO's Telecommunications Commitment* (Newcastle upon Tyne, Cambridge Scholars Publishing, 2012).

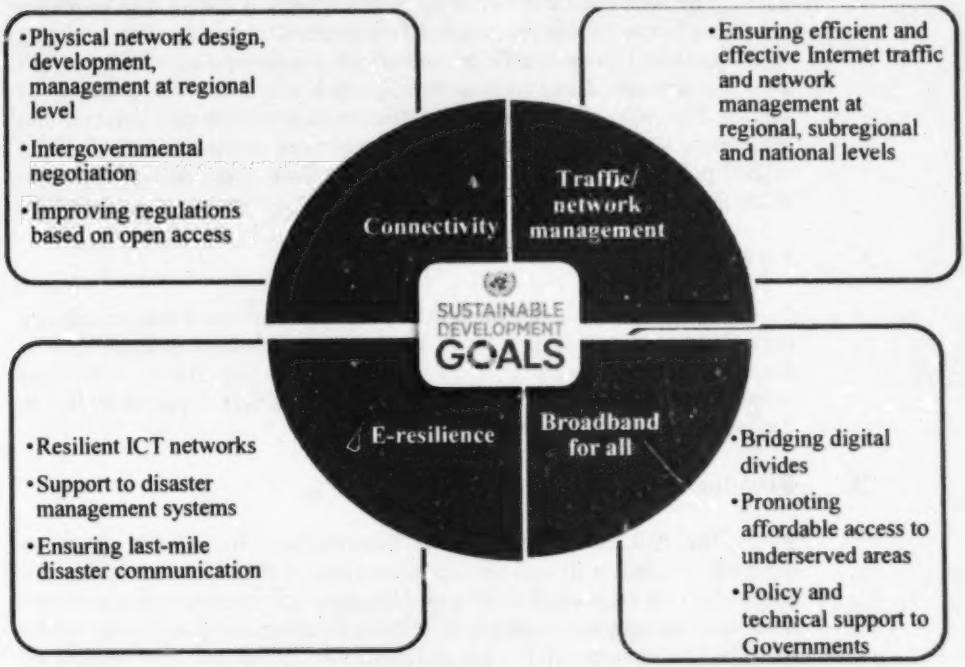
(a) Physical infrastructure upgrade and interconnection;

(b) Internet traffic management;

(c) Building regional network resilience;

(d) Promoting broadband access in underserved areas.

Figure I
Four pillars of the Asia-Pacific Information Superhighway


•Physical network design, development, management at regional level
•Intergovernmental negotiation
•Improving regulations based on open access
•Ensuring efficient and effective Internet traffic and network management at regional, subregional and national levels
Connectivity
Traffic/ network management
SUSTAINABLE DEVELOPMENT GOALS
E-resilience
Broadband for all
•Resilient ICT networks
•Support to disaster management systems
•Ensuring last-mile disaster communication
•Bridging digital divides
•Promoting affordable access to underserved areas
•Policy and technical support to Governments

23. ESCAP and the International Telecommunication Union collaborated on an interactive map of the Information Superhighway.[11] The interactive map has been used to identify a number of missing terrestrial fibre-optic links as well as submarine cable choke points.

A. Connectivity

24. The Asia-Pacific Information Superhighway initiative advocates enhancing seamless regional broadband fibre-optic backbone connectivity by upgrading and increasing the resilience of and integrating cross-border intra- and interregional broadband backbone networks, which will lead to open access and better balanced undersea and terrestrial networks. In addition, the initiative advocates leveraging existing regional connectivity opportunities offered by the Asian Highway and the Trans-Asian Railway networks, as well as other trans-border infrastructure, to utilize the rights of way of existing and planned transport networks and to achieve rapid, cost-effective deployment of optical fibre across and within countries. Besides developing regional terrestrial fibre-optic cables, the Asia-Pacific Information Superhighway

[11] www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/asia-pacific-information-superhighway-maps.

initiative also seeks to establish operation models of terrestrial cables, facilitate the formation of trans-border terrestrial cable networks and enhance the quality and efficiency of transition, so as to put the completed terrestrial cable resources to more efficient use and to promote regional interconnectivity. These aspects are highlighted in the Asia-Pacific Information Superhighway Regional Cooperation Framework Document.[12]

B. Traffic and network management

25. The Asia-Pacific Information Superhighway initiative also promotes enhancing Internet traffic exchange and management systems and harmonizing related policies in a more efficient and effective manner, domestically as well as at the subregional and regional levels, which will lead to better quality of service. This pillar aims to establish sufficient Internet exchange points within the region, harmonize Internet traffic management practices, principles and related policy and regulatory frameworks in more open, neutral and non-discriminatory ways, and set out general principles on Internet exchange points.

C. E-resilience

26. The Asia-Pacific Information Superhighway initiative aims to enhance the resilience of existing/planned ICT infrastructure through methods such as enhanced network diversity, while recognizing the importance of resilient infrastructure to sustainable development and the critical role played by ICT in disaster risk reduction and management.

D. Broadband for all

27. The Asia-Pacific Information Superhighway initiative supports an environment that will lead to the promotion of inclusive access for all, acknowledging the special needs and challenges faced by least developed and landlocked developing countries. In addition to enhancing international fibre-optic backbone connectivity, the initiative also drives the development of domestic ICT infrastructure in related countries, including domestic backbone and backhaul networks, access network and internet data centres, among others. The improvement of domestic ICT infrastructure can promote large-scale broadband expansions by lowering broadband costs per capita. Effective use of Internet data centres can lead to the absorption of the demand for international bandwidth and the promotion of the development of domestic ICT applications.

IV. Asia-Pacific Information Superhighway layered map of the network structure

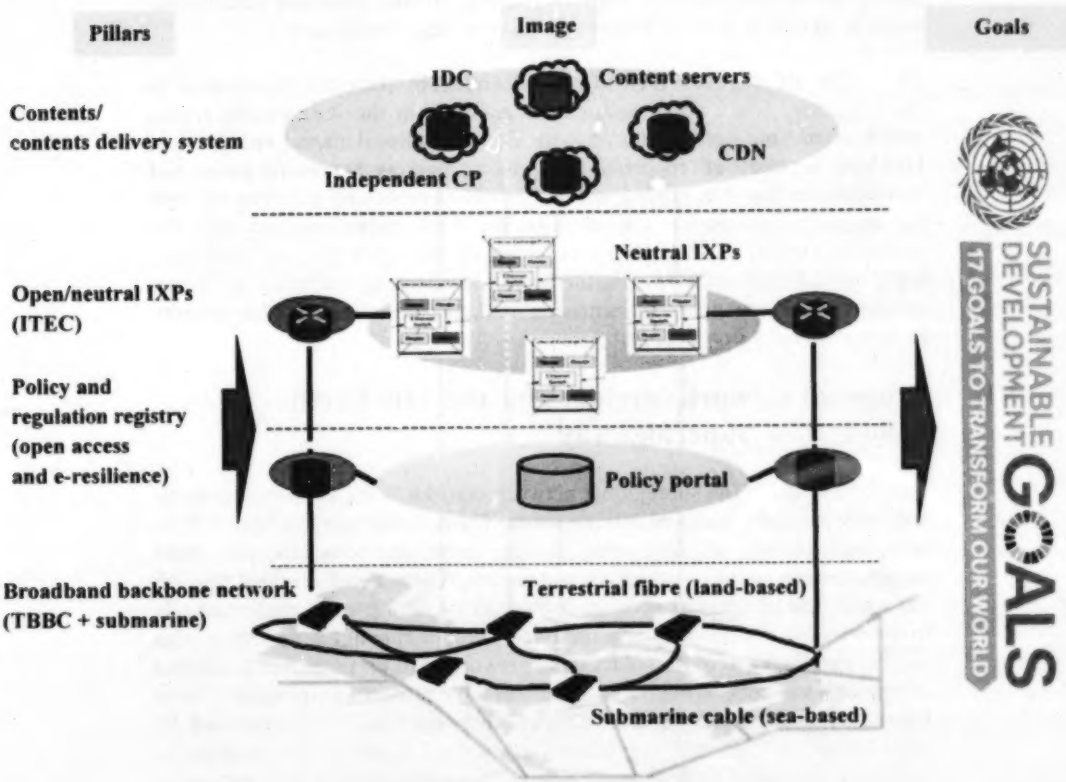
28. The Asia-Pacific Information Superhighway can also be described with a layered map of the network structure, which primarily explains functional differences in each layer of the network, as shown in figure II, such as the broadband backbone network layer, the policy and regulation layer, the open neutral Internet exchange point layer and the content/content delivery layer. The broadband backbone network layer shall be made up of well-balanced seamless submarine and terrestrial fibre networks after identification of missing links at the national, subregional and regional levels. The policy and regulation layer represents a regional governance system or regional coordination body that coordinates intermediate Internet Protocol (IP) routing

[12] E/ESCAP/CICTSTI(1)/3.

and peering or transit and negotiates with regulators to set network neutrality and non-discriminatory rights of access to the backhaul for the newcomers.

29. The open neutral Internet exchange points layer ensures domestic IP traffic exchange among domestic Internet service providers and regional direct IP peering/transit among neighbouring countries. It is possible to have direct fibre interconnection between Internet exchange points to support the Internet service providers who need diversified connectivity to Internet exchange points or Internet service providers in other countries. The content or content delivery layer serves as the Internet data centre, where independent providers provide content through the content delivery network. The content delivery network service providers and content provider have a very important role in that they reduce cross-border Internet traffic by caching more content on local servers.

Figure II
Asia-Pacific Information Superhighway layered map



Source: ESCAP and National Information Society Agency, *A Pre-Feasibility Study on the Asia-Pacific Information Superhighway in the ASEAN Sub-region: Conceptualization, International Traffic & Quality Analysis, Network Topology Design and Implementation Model* (Bangkok, 2016). Available from www.unescap.org/sites/default/files/ASEAN%20report%20final.pdf.

Abbreviations: CDN, content delivery network; CP, content provider; IDC, Internet data centre; ITEC, Internet traffic exchange connectivity; IXP, Internet exchange point; TBBC, terrestrial broadband backbone connectivity.

V. Medium-term objectives of the Asia-Pacific Information Superhighway

30. For the current time frame of the Master Plan, 2019 to 2022, the medium-term objectives focus on three aspects: (a) seamless, affordable and reliable regional broadband connectivity, with well-balanced sea- and land-based connectivity and Internet traffic exchange management, (b) the promotion of e-resilience and (c) the promotion of inclusive broadband access in underserved areas and narrowing the digital divide.

31. Regional broadband connectivity initiatives should build on existing research and analyses and lead to concrete initiatives by (a) identifying missing links,[13] (b) tapping cross-sectoral synergies for fibre-optic deployment and (c) improving regulatory frameworks and promoting open access to critical infrastructure.

32. Sufficient numbers of Internet exchange points at domestic and subregional levels and common principles on Internet traffic exchange need to be established to prevent Internet traffic tromboning and to improve service quality for regional backbone networks for cross-border inter- and intraregional Internet service in order to address the issue of high transit costs.

33. The objectives for inclusive broadband access include improvements to the regulatory frameworks and market practices in the Asia-Pacific region which often limit competition in both the international transit and national backbone segments of broadband transmission markets. Successful policy and regulatory measures in this respect will involve simplifying licensing regimes for access to submarine and cross-border connections and reducing the exclusive control of incumbents on international gateways and submarine cable land-based stations. Furthermore, accelerating reforms to foster competition on broadband transmission markets is also seen as a key priority to lower the costs of broadband.

VI. Proposed network corridors for the Asia-Pacific Information Superhighway

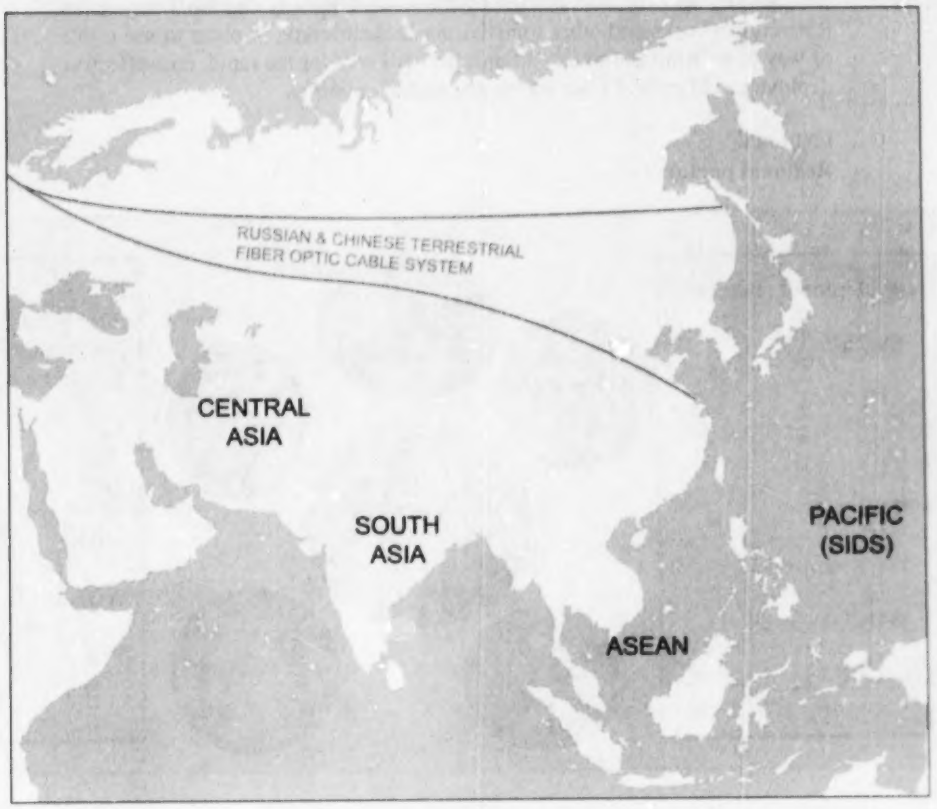
34. Physically, the subregional network corridor is the cross-border intra- and interregional broadband infrastructure. The network corridor links will be composed mainly of fibre-optic cables, ducts and conduits that cross neighbouring countries, subregions and regions. The network corridor, through the sophisticated physical network infrastructure, will play an important role in determining connectivity and the price of international bandwidth in Asia and the Pacific. Each of the subregional networks will be connected to another subregional network through a corridor using the respective subregion's main Internet exchange points. The physical networks will be supported by harmonized policies and regulations as well as measures to promote e-resilience and inclusive broadband access, including regional cooperation, as illustrated in the Asia-Pacific Information Superhighway Regional Cooperation Framework Document.

35. The establishment of Internet exchange points in each country, which in turn will be connected to the subregional Internet exchange points, which will also be the point of presence for external connectivity to Europe and America, will constitute one main component of the network corridor. In total, five network corridors have been identified for the Asia-Pacific Information

[13] See www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/resources.

Superhighway (figure III). The Russian-Chinese fibre-optic cable system is considered a network corridor as it will serve as alternate terrestrial routes for international connectivity.

Figure III
Proposed network corridors in Asia and the Pacific



Abbreviations: ASEAN, Association of Southeast Asian Nations; SIDS, small island developing States.

VII. Regional partners for the Asia-Pacific Information Superhighway

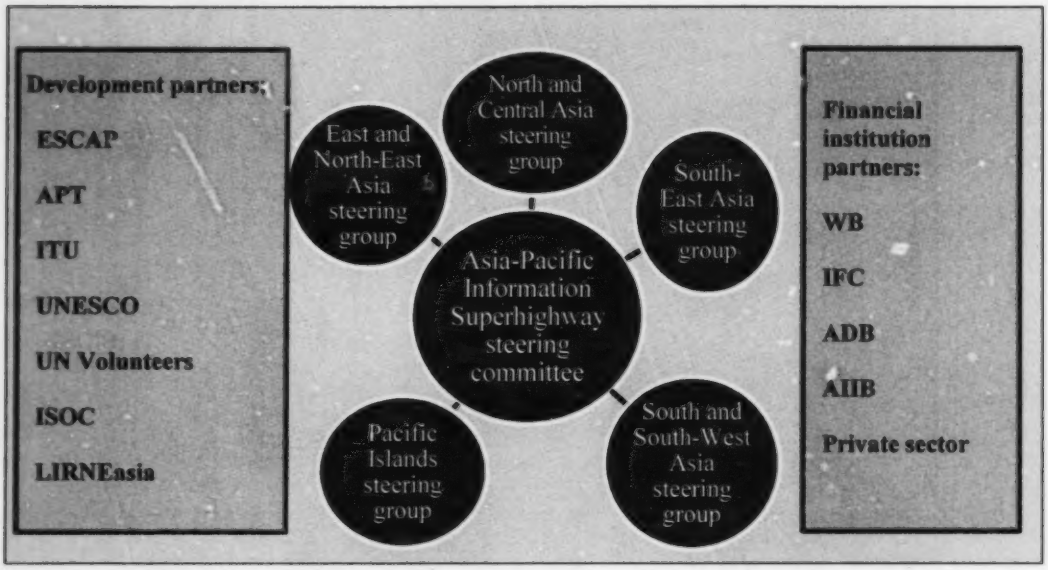
36. Partnerships are an essential building block in the Master Plan for the Asia-Pacific Information Superhighway, as the Information Superhighway covers a wide geographic area and comprises various layers of networks, and the infrastructure will be primarily developed by the private sector. It is anticipated that, through the regional partnership comprising the private sector, Governments, international agencies, non-governmental organizations, research institutes and regional/international financial institutions, the coordination, harmonization, implementation and funding opportunities for various Asia-Pacific Information Superhighway sub-projects could be secured, while at the same time sharing expertise, good practices and lessons learned.

37. Regional partners constitute many stakeholders working together within the common framework of the Asia-Pacific Information Superhighway initiative (figure IV). Within this framework, there are five subregional steering groups consisting of members of the steering committee. Development partners and financial institution partners continue to provide support through

their respective mandates at the national, subregional and regional levels to member States. Further details about a regional cooperation framework and financing options are contained in the Asia-Pacific Information Superhighway Regional Cooperation Framework Document.

38. Collaboration and partnerships, including with entities in other socioeconomic sectors, are essential to leveraging existing regional connectivity opportunities offered by the Asian Highway and the Trans-Asian Railway networks and other trans-border infrastructure, in order to use rights of way of existing and planned transport networks for the rapid, cost-effective deployment of optical fibre across and within countries.

Figure IV
Regional partners

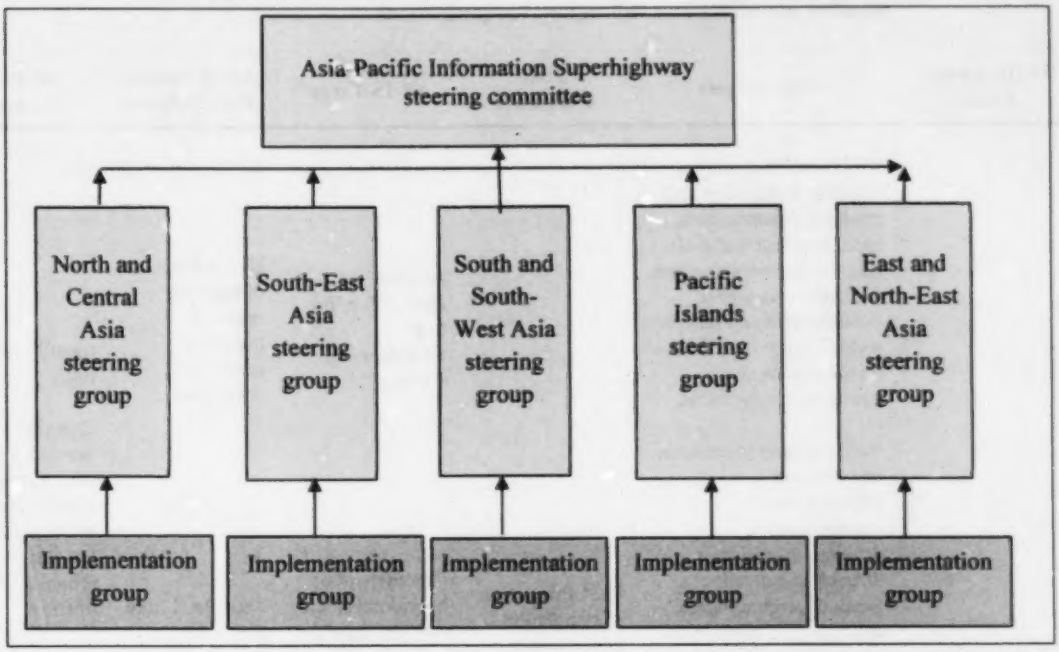


Abbreviations: ADB, Asian Development Bank; AIIB, Asian Infrastructure Investment Bank; APT, Asia-Pacific Telecommunity; ESCAP, Economic and Social Commission for Asia and the Pacific; IFC, International Finance Corporation; ISOC, Internet Society; ITU, International Telecommunication Union; UNESCO, United Nations Educational, Scientific and Cultural Organization; UN Volunteers, United Nations Volunteers WB, World Bank.

VIII. Governance structure of the Asia-Pacific Information Superhighway

39. The proposed governance structure of the Asia-Pacific Information Superhighway is intended to support the effective implementation of activities of the initiative (figure V). It consists of the overall Asia-Pacific Information Superhighway regional layer (steering committee), under which each subregional corridor (steering group) will be supported, where necessary, by an implementation group consisting of telecommunications operators. Activities will be developed around the four pillars, which should facilitate the implementation of the subregional and national ICT initiatives. As shown in figure V, the steering groups will be tasked with discussing and identifying issues pertaining to connectivity, traffic management, e-resilience and the digital divide for each subregion.

Figure V
Proposed governance structure for the Asia-Pacific Information Superhighway network corridors



40. The proposed governance structure has been designed to align with the subregional initiatives so that it meets the needs of the subregions and dovetails with the overall objectives of the Asia-Pacific Information Superhighway initiative. In addition, the governance structure will capitalize on relevant international expertise from international and specialized agencies, such as the International Telecommunication Union, the Asia-Pacific Telecommunity, the United Nations Educational, Scientific and Cultural Organization, United Nations Volunteers, the World Bank, the Asian Development Bank, the Asian Infrastructure Investment Bank and other financial institutions. It will also include other institutions such as the Internet Society, LIRNEasia and other research institutes/think tanks as partners. Membership of each subregional steering group will not be limited to member States of that particular subregion, but will be open to all ESCAP member States.

41. The regional layer will consist of monitoring, coordination and advisory functions, which will subsequently report to various intergovernmental bodies through the ESCAP secretariat, as described in the Asia-Pacific Information Superhighway Regional Cooperation Framework Document.

IX. Strategic initiatives 2019–2022

42. The proposed strategic initiatives of the Asia-Pacific Information Superhighway for 2019–2022 seek to improve broadband connectivity in the Asia-Pacific region (table 1), based on key issues highlighted by member States and partners in the first session of the Asia-Pacific Information Superhighway held in 2017. ESCAP member countries and private sector

Table 1

Strategic initiatives of the Asia-Pacific Information Superhighway 2019–2022

Initiative 1: Identification, coordination, deployment, expansion and integration of the regional backbone networks, in collaboration with member countries and subregional organizations

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Target	AP-IS Master Plan Outputs	AP-IS Focus Areas
C2 Information and communication infrastructure: an essential foundation for the Information Society C11. International and regional cooperation	9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all 9.a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States 9.c: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism	9.c.1 Proportion of population covered by a mobile network, by technology 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed 17.8.1 Proportion of individuals using the Internet	At least one direct fibre link to a neighbouring country Deployment of hybrid mesh and ring structure for resilient regional terrestrial backbone networks International and regional backbone speed to be minimum 25 Mbps (Federal Communications Commission) Consensus built on cross-border, cross-sectoral fibre optic co-deployment	Development of seamless regional backbone networks developed Terrestrial fibre network proposed for new routes and upgrades Coherent mesh network proposed Development of operation models of trans-border terrestrial cables Development of domestic broadband infrastructure	Identify missing links Examine backbone network routes in each subregion Plan centre node establishment for low cost and reliable delivery of traffic Design hybrid mesh and ring structure of resilient regional terrestrial backbone network Study operating models and standards and quality standards, inter alia, of trans-border terrestrial cable networks Develop broadband network development strategies in least developed countries Develop and plan data centres, cloud information-sharing and other affordable alternatives

Supporting activities (2018–2022)	Success Indicator	Party responsible
1.1 Conduct detailed feasibility studies in some corridors, taking into account the special needs and challenges of landlocked developing countries, least developed countries and small island developing States	Traffic, revenue, and preliminary costs and affordability studied in each subregion	Economic and Social Commission for Asia and the Pacific (ESCAP), National Information Society Agency (NIA), Korea Telecom (KT)
	Special needs and challenges for landlocked developing countries, least developed countries and small island developing States identified	ESCAP, LIRNEAsia, Internet Society (ISOC), China Academy of Information and Communications Technology (CAICT), other subregional organisations*
	Infrastructure development planning with member countries and the private sector coordinated among small island States	ESCAP, International Telecommunication Union (ITU), Asia-Pacific Telecommunity (APT) , other subregional organisations*
1.2 Update Asia-Pacific Information Superhighway transmission maps	Cross-sectoral synergy identified with existing roads, railroad, energy and other infrastructure	ESCAP, ITU, Global Energy Interconnection Development and Cooperation (GEIDCO) and member countries
	Asia-Pacific Information Superhighway transmission map updated	
1.3 Rough order of magnitude	Cost estimation undertaken in collaboration with suppliers where applicable	ESCAP, NIA
	Operation model developed for trans-boundary infrastructure initiative	ESCAP, CAICT

* - Including the Association of Southeast Asian Nations (ASEAN), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), Economic Cooperation Organisation (ECO), Pacific Community (SPC), Pacific Islands Telecommunications Association (PITA), South Asian Association for Regional Cooperation (SAARC), University of the South Pacific (USP) among others.

Initiative 2: Establish a sufficient number of Internet exchange points at the national and subregional levels and set out common principles on Internet traffic exchange to prevent Internet traffic tromboning, decrease transit costs and improve service quality

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Target	AP-IS Master Plan Outputs	AP-IS Focus Areas
C2: Information and communication infrastructure: an essential foundation for the Information Society C11 International and regional cooperation	9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all 9.a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States 9.c: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism	9.c.1 Proportion of population covered by a mobile network, by technology 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed 17.8.1 Proportion of individuals using the Internet	Round trip latency of international and regional backbone network to be maximum 100 msec (per ITU-T standard) Establish at least 2 domestic IXPs for domestic traffic to be exchanged within a country Non-discretionary direct bilateral peering/transit agreement between ISPs across countries Establishment of intra-and inter-regional neutral IXPs Tromboning index to be maximum 5	Harmonized Internet traffic exchange and management Removal of entry barriers to new Internet Service Providers and promote fair market competition Enhanced presence and capabilities of regional, subregional and national Internet Exchange Points	Establish national Internet exchange points for the domestic traffic to be exchanged inside the State Establish intra-/interregional, neutral Internet exchange points Promote non-discriminatory direct bilateral peering/transit between neighbouring States' Internet service providers

Supporting activities (2018–2022)	Success Indicator	Party responsible
2.1 Conduct regional diagnostic study	Best practices in Internet traffic exchange/management in the region analysed in the diagnostic study	ESCAP, ITU, APT, ISOC, Asia Pacific Network Information Centre (APNIC), Internet Corporation for Assigned Names and Numbers (ICANN), member countries and the private sector
	Internet exchange point map in the region established and updated	ISOC
2.2 In-depth study on traffic production volume	Traffic volume, destination and distribution, routing and distance including overall Internet service quality at the national and regional levels identified in the study	ESCAP, in consultation with the private sector, APNIC and member countries
2.3 Internet exchange point system and operation model	Feasibility study of Internet exchange points, including operating principle and governance model, analysed	ESCAP, APNIC, research institutes and the private sector
2.4 Rough order of magnitude	Cost of establishing ISPs and IXPs estimated in collaboration with device vendors or partner entities	ESCAP, in consultation with the private sector

Initiative 3: Regional social and economic studies

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Master Plan Outputs	AP-IS Master Plan Outputs	AP-IS Master Plan Focus Areas
C2 - Information and communication infrastructure; C3 - Access to information and knowledge; C7 - ICT applications	4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship; 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all;	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill 4.a.1 Proportion of schools with access to: (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d)	At least 2 ESCAP AP-IS subregional plans endorsed, prioritising the development of ICT infrastructure readiness for future emerging technologies	Deepened knowledge and understandings on the development of ICT infrastructure connectivity and its implication on emerging technologies published and findings shared with ICT government officials	Review of emerging technologies and discern their impacts on economies and society for the inclusive development of ICT that allows policymakers to make informed decisions Conduct needs assessment of ICT development in ESCAP countries,

	5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women; 9.c.1 Proportion of population covered by a mobile network, by technology; 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020;	adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the WASH indicator definitions); 5.b.1 Proportion of individuals who own a mobile telephone, by sex; 9.c.1 Proportion of population covered by a mobile network, by technology.	Increased awareness of ESCAP member states on the social and/or economic impact of broadband connectivity At least 2 ESCAP AP-IS subregional plans recognise the importance of various alternative technologies for enhanced access to affordable broadband connectivity	Knowledge and understandings on the social and/or economic impacts of ICT broadband connectivity in ESCAP countries published and findings shared with ICT government officials Awareness raised on alternative broadband connectivity technologies conducted and findings shared with ICT government officials in ESCAP countries with special needs	taking into account countries with special needs (Landlocked developing countries, Least developed countries and Small island developing states) Conduct research on alternative broadband connectivity technologies in special needs countries

Supporting activities (2018-2022)	Success Indicator	Party responsible
3.1 Conduct studies on review on the development of ICT infrastructure connectivity and its implication on emerging technologies 3.2 Conduct studies on the social and/or economic impacts of ICT broadband connectivity in ESCAP countries published 3.3 Conduct studies on alternative broadband connectivity technologies	Key elements, challenges and opportunities identified and shared with ESCAP member governments through AP-IS meetings and online platforms	ESCAP, United Nations Educational, Scientific and Cultural Organization (UNESCO), LIRNEAsia, ISOC, ITU

Initiative 4: Enhancing ICT infrastructure resilience in the Asia-Pacific region

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Target	AP-IS Master Plan Outputs	AP-IS Focus Areas
C5 Building confidence and security in the use of ICT C6: Enabling environment	9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all 9.a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States	9.c.1 Proportion of population covered by a mobile network, by technology 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed 17.8.1 Proportion of individuals using the Internet	Resilient network topology design promoted in each subregion Backbone development taking into account the requirements of redundancy and resilience by integrating alternative and complementary fibre routes Diversification of routes by promoting co-deployment of fibre optic cables embedded along passive infrastructure	Terrestrial fibre links to connected to international backbone networks for diversity and resilience Diversified routes, including co-deployment of fibre-optic cables embedded along passive infrastructure Protecting critical infrastructure with disaster risk reduction measures Cybersecurity preparedness Introduction of Internet Protocol version 6	Explore ways to strengthen e-resilience in fibre link by connecting from Asia to Europe Explore the provision of additional bandwidth for landlocked countries, including Central Asian countries Explore fibre-optic route diversification capitalizing on the infrastructure of the Asian Highway and Trans-Asian Railway networks Integrate approach to plan infrastructure development, incorporating disaster management from design stage Support and review national ICT preparedness for cybersecurity Support preparedness for Internet Protocol version 6

Supporting activities (2018–2022)	Success Indicator	Party responsible
4.1 Conduct studies on elements of resilient regional and national backbones, taking into account disaster risks in each subregion	Key elements of resilient regional and national backbones identified	ESCAP, Asian Development Bank
	Vulnerability maps used to identify disaster risks in network designs and development	ESCAP, LIRNEAsia, CVISNet
4.2 Conduct studies on co-deployment along passive infrastructure	Legal, legislative and technical challenges and opportunities for co-deployment along the Asian Highway Network and Trans-Asian Railway Network identified	ESCAP, GEIDCO, Thai Intelligent Transport Systems Association (ITS)

	Consultations with partners and stakeholders in the energy sector conducted	
4.3 Conduct studies on cybersecurity	Emerging trends on cyberattacks and cybersecurity identified for relevant policy recommendations	United Nations Office on Drugs and Crime (UNODC), APT, ITU
4.4 Awareness raising, and capacity development conducted on the transition to IPv6	Government officials and policy/decision makers enhanced knowledge on the requirements of IPv6 transition	APNIC

Initiative 5: Policy and regulations for leveraging existing infrastructure, technology and inclusive broadband initiatives

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Target	AP-IS Master Plan Outputs	AP-IS Focus Areas
C1: The role of governments and all stakeholders in the promotion of ICTs for development C2: Information and communication infrastructure: an essential foundation for the Information Society C6. Enabling environment	9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all 9.a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States 9.c: Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020 17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism	9.c.1 Proportion of population covered by a mobile network, by technology 17.6.2 Fixed Internet broadband subscriptions per 100 inhabitants, by speed 17.8.1 Proportion of individuals using the Internet	Development, updates and harmonization of national and subregional broadband policies and regulations, including infrastructure sharing, Internet traffic management and inclusive broadband connectivity	Regional consensus built on cross-border infrastructure sharing principles Regional consensus on elements of enabling broadband policies, regulations, programmes and legislations identified for national and subregional policy updates and harmonization Case studies and analysis on good practices and lessons learned on inclusive broadband Regulatory reforms pertaining to taxes and customs duties for telecommunications equipment	Develop cross-border infrastructure-sharing policy models based on consultations and partnerships Identify best practices and lessons learned emanating from regional, subregional and national broadband policies and measures to promote inclusive broadband access Support national policies and regulations to enable infrastructure development and inclusive broadband Enable policies that lead to open access, non-discriminatory pricing, competition and innovation and regulatory reforms with telecommunications related taxes and custom duties

Supporting activities (2018–2022)	Success Indicator	Party responsible
5.1 Conduct studies on good practices and lessons learned on infrastructure sharing	Good practices and lessons learned on cross-border and national infrastructure sharing identified Principles and norms identified Infrastructure sharing models developed	ESCAP, NIA, International Institute for Asian Studies (IIAS), ITS
5.2 Conduct studies on regional, sub-regional and national broadband policies, regulations and programmes on inclusive broadband	Good practices and lessons learned identified from inclusive broadband case studies	UNESCO, ESCAP, LIRNEAsia, ISOC, ITU, APT, World Bank
5.3 Conduct studies on policy and regulatory measures on open access, affordability, completion and non-discriminatory pricing	Challenges and opportunities relevant to the AP-IS initiatives identified for regional discussions	ESCAP

Initiative 6: Capacity-building

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Target	AP-IS Master Plan Outputs	AP-IS Master Plan Focus Areas
C2. Information and communication infrastructure; C3. Access to information and knowledge; C4. Capacity building; C7. ICT applications	5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women; 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020; 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship; 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-	5.b.1 Proportion of individuals who own a mobile telephone, by sex; 9.c.1 Proportion of population covered by a mobile network, by technology; 4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill; 4.a.1 Proportion of schools with access to: (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d)	Capacity built among ESCAP member States on the potential use of ICT for productive use Increased awareness among ESCAP member States on the social and/or economic impact of broadband connectivity Increased awareness of Asia-Pacific countries on the insights of researches focusing on the four pillars of the Asia-Pacific Information Superhighway - Master Plan	Knowledge and awareness on the productive use of broadband connectivity in Asia and the Pacific made available through reports and analysis disseminated at capacity building workshops for ICT government officials and stakeholders Best practices and lessons learned on network traffic management and deployment of terrestrial/submarine fibre identified and findings disseminated through capacity building workshops for ICT government officials and stakeholders	Conduct capacity-building on enhancing the productive use of broadband connectivity in Asia and the Pacific Conduct capacity-building on sharing of good practices and lessons learned at the regional level pertaining to network traffic management and deployment of terrestrial/submarine fibre networks Enhance knowledge and skills on the use of ICT, Internet, its applications and AP-IS pillars among government leaders, civil servants, women entrepreneurs, and youth Conduct technical training on establishing Internet

violent, inclusive and effective learning environments for all	adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the WASH indicator definitions)	Training modules developed on the use of ICT, Internet and its applications, and disseminated through capacity building workshops Technical training conducted for government officials and stakeholders in Asia-Pacific countries	service provider and cybersecurity

Supporting activities (2018-2022)	Success Indicator	Party responsible
6.1 Undertake studies on the productive use of broadband connectivity in Asia and the Pacific published and findings disseminated 6.2 Conduct studies on best practices and lessons learned at the regional level on network traffic management and deployment of terrestrial/submarine fibre networks published and findings and findings disseminated 6.3 Develop training modules on the use of ICT, Internet and its applications and AP-IS pillars and disseminated through capacity building workshops 6.4 Undertake analysis focusing on the four pillars of the Asia-Pacific Information Superhighway Master Plan 6.5 Conduct technical training for government officials in Asia-Pacific countries	Studies and capacity training workshops completed in a timely manner and relevant to the national, subregional and regional implementation of the AP-IS initiatives	ESCAP, Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT), UNESCO, Indian Institute of Management, Asia Pacific Network Information Centre

Initiative 7: Asia-Pacific Information Superhighway project funding mechanism based on public-private partnerships

WSIS Action Lines	SDG Targets	SDG Indicators	AP-IS Target	AP-IS Master Plan Outputs	AP-IS Focus Areas
C1. The role of governments and all stakeholders in the promotion of the use of ICTs for development C11. International and regional cooperation	17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism 17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation 17.17. Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	17.9.1 Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries 17.6.1 Number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation 17.17.1 Amount of United States dollars committed to public-private and civil society partnerships	Funding mechanisms, agreements and private-public partnerships for the promotion of regional, subregional and national infrastructure development	Formulation of an Asia-Pacific Information Superhighway funding platform	Explore and develop a mechanism to fund the Asia-Pacific Information Superhighway projects in partnership with the World Bank, the Asian Development Bank, the Asian Infrastructure Investment Bank and other financial institutions Explore public funding arrangements and public-private partnerships and special purpose vehicles for the promotion of infrastructure development Explore government funding options on infrastructure and Internet exchange point construction and operations Collect information on ICT project funding mechanisms in the Asia-Pacific region

Supporting activities (2018–2022)	Success Indicator	Party responsible
7.1 Conduct studies on financing mechanisms for regional, subregional and national broadband network development	Good practices and lessons learned identified Elements of funding mechanisms identified for regional discussion Multistakeholder views reflected in the policy recommendations	ESCAP, Russian Academy of Sciences
7.2 Develop projects and initiatives to funded by governments and various stakeholders	Projects and initiatives contribute to the AP-IS implementation effectively An increasing number of partners and stakeholders involved in the implementation	ESCAP, Russian Academy of Sciences

X. Implementation plan

43. The timeline for the Master Plan is 2019 to 2022 (table 2). In 2018, there will be more subregional steering group meetings to discuss and address subregional issues. Review of progress will be submitted to the Committee on Information and Communications Technology, Science, Technology and Innovation at its fourth session, in 2022. Given that some activities may need to be implemented beyond 2022, the Master Plan will be updated and revised at the end of the implementation period (2022), as described in the Asia-Pacific Information Superhighway Regional Cooperation Framework Document.

Table 2
Asia-Pacific Information Superhighway implementation plan 2019–2022 (activities not exhaustive)

Action item	2018	2019	2020	2021	2022
Subregional steering group to be established and operational					
Initiative 1					
Initiative 2					
Initiative 3					
Initiative 4					
Initiative 5					
Initiative 6					
Initiative 7					
Present updated Master Plan for adoption	2nd session of Committee	75th session of Commission			
Evaluation and progress report			3rd session of the Committee		4th session of Committee

Annex I

Terms of reference of the Asia-Pacific Information Superhighway Steering Committee

I. Membership criteria

1. The membership of the Asia-Pacific Information Superhighway Steering Committee shall consist of all member States of the Economic and Social Commission for Asia and the Pacific (ESCAP) and, due to the nature of the assigned activities, it will also consist of multi-stakeholder representatives of non-profit organizations and research institutes with policy and technical expertise and experts from member country Governments (in their personal capacity).

II. Organization

2. The Bureau shall be elected by Steering Committee members for a term of one year.

3. The Steering Committee shall meet once a year.

4. The Chair of the Steering Committee shall be elected by the members of the Steering Committee.

5. The Bureau will represent the Steering Committee at various international and regional venues if and when necessary and inform the members accordingly.

6. The Steering Committee shall be supported in its functions by the secretariat.

III. Objectives

7. The Steering Committee shall monitor the implementation of the Master Plan for the Asia-Pacific Information Superhighway and the Asia-Pacific Information Superhighway Regional Cooperation Framework Document, coordinate subregional work, provide policy guidance and, if necessary, set up a technical advisory group.

IV. Reporting process

8. Member States and implementing partners will have the opportunity to report on : activities which were undertaken within the Asia-Pacific Information Superhighway four pillars and strategic initiatives; new activities which could be considered as strategic initiatives and pillars in coming years; and new partnerships, to be presented in the next meeting of the Steering Committee.

9. Reporting by Member States and implementing partners of activities for each strategic initiatives and pillars may be undertaken through the online platform currently hosted by ESCAP. An online leader for each Pillar will coordinate submissions and activities reporting in order to: share information, news, articles, reports on the topic of a particular Pillar; encourage interactions among participants as well as among Pillars; identify possible regional-level issues, solutions and approaches; serve as a window to subregional Steering Group and subregional Implementation Group on specific issues. The online leader reports to the Steering Committee meeting on the progress of activities.

10. The secretariat prepares the consolidated report of each Pillar and for each subregion.

11. The Steering Committee will also review issues, recommendations and necessary actions from Pillar leads and subregional Steering Group Chairs.

12. At the end of the implementation year, the governance structure and implementation will be assessed and discussed at the SC, to lead to the update to the Master Plan for the next 4 years.

Annex II

Terms of reference of the Asia-Pacific Information Superhighway subregional Steering Groups

I. Membership criteria

1. The membership of the Asia-Pacific Information Superhighway subregional steering groups shall consist of member States of the Economic and Social Commission for Asia and the Pacific (ESCAP) from the subregion concerned as well as any other ESCAP member States interested in subregional work.

II. Organization

2. The invitation to the subregional Steering Group membership will be sent after the first Steering Committee meeting to all member countries, coordinated by the ESCAP secretariat.

3. The subregional Steering Group memberships will be announced or updated at Steering Committee meetings.

4. The bureau of each steering group shall be elected by ESCAP member States from the subregion for a term of one year.

5. The chair of each steering group shall be elected by the members of that Steering Group.

6. Venue of Steering Group meetings is decided by the Steering Group members and secretariat, in conjunction with existing subregional meetings and structures, including that of ESCAP subregional offices.

7. Each Steering Group shall be supported in its functions by the secretariat.

8. Implementation Group will be established by the Steering Group as needed, and composition and terms of membership would be determined by Steering Group based on the principles enshrined in the AP-IS Master Plan and Regional Cooperation Framework Document.

III. Objectives

9. Each Steering Group shall monitor the implementation of subregional ICT projects, provide policy guidance and, if necessary, set up an implementation group.

10. The subregional Steering Groups will support existing regional and subregional initiatives through the implementation of the subregional implementation plans.

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Committee on Information and Communication Technology, Science, Technology and Innovation

Second session
Bangkok, 29–31 August 2018
Item 3 (a) of the provisional agenda*
Policy issues for information and communications technology: promoting the integration and application of information and communications technology policy through the Asia-Pacific Information Superhighway initiative

Asia-Pacific Information Superhighway Regional Cooperation Framework Document, 2019-2022

Note by the secretariat

Summary

In accordance with resolution 71/10 of the Economic and Social Commission for Asia and the Pacific (ESCAP), the 1st meeting of the Working Group on the Asia-Pacific Information Superhighway was held in Incheon, Republic of Korea, in September 2015. At that meeting, it was agreed that a master plan for the Asia-Pacific information superhighway and a regional cooperation framework document would be developed and that they would be mutually reinforcing. The Asia-Pacific Information Superhighway Steering Group was formed to carry out that task. The aim of this Regional Cooperation Framework Document is to identify areas of cooperation between member countries, in particular how they can cooperate and collaborate at the regional and subregional levels in support of the implementation of the Master Plan. Norms and principles are identified, as are modalities and processes of associated regional cooperation among member countries and various organizations at the regional and subregional levels. Various potential cooperation and financing modalities are also included, with examples, in considering the development of information and communications technology infrastructure in the Asia-Pacific region. This Regional Cooperation Framework Document was considered for endorsement at the 2nd meeting of the Working Group, which was held in Guangzhou, China, on 29 and 30 August 2016 and was subsequently endorsed by the first session of the Committee on Information and Communications Technology, Science, Technology and Innovation in October 2016.

At the first session of the Asia-Pacific Information Superhighway held in Dhaka, Bangladesh, from 1-2 November 2017, the member countries discussed and agreed to update the document for the period from 2019 to 2022. The present document is therefore submitted to the second session of the Committee on Information and Communications Technology, Science, Technology and Innovation for its endorsement.

* ESCAP/CICTSTI/2018/L.1/Rev.1.

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I. Introduction

1. The aim of this Regional Cooperation Framework Document is to identify areas of cooperation between member countries, in particular how they can cooperate and collaborate at the regional and subregional levels in support of the implementation of the Master Plan for the Asia-Pacific Information Superhighway. It also includes areas of cooperation with the subregional organizations, international financial institutions, the private sector and other United Nations agencies. The Master Plan is intended not as a substitute for member countries' and stakeholders' initiatives and plans related to information and communications technology (ICT), but to add value in order to improve seamless ICT connectivity and increase interconnections by deploying regional broadband networks, establishing sufficient Internet exchange points, enhancing ICT infrastructure resilience and providing inclusive access to broadband Internet for all in the Asia-Pacific region.

2. In the Master Plan, in line with the four pillars, seven strategic initiatives for seamless regional ICT connectivity of the Asia-Pacific information superhighway are identified. Furthermore, the Master Plan aims to capitalize on a multilateral, regional platform to address areas in which bilateral cooperation may not achieve the desired result, while ensuring synergies and mutual alignments between regional, subregional and national ICT plans, policies and initiatives.

II. Objectives

3. The overall objectives of the Regional Cooperation Framework Document are to help achieve the overarching goals of the Master Plan by:

(a) Fostering partnership and collaboration between member countries, international financial institutions, United Nations agencies, subregional organizations, the private sector, civil society, research institutes and academia in order to improve seamless regional connectivity in Asia and the Pacific;

(b) Identifying areas of synergy between stakeholders' ICT initiatives and plans by conducting in-depth analytical studies on feasibility, demand forecasts and network resilience, as well as harmonization of policies and regulations wherever appropriate;

(c) Raising awareness of the importance of regional cooperation for regional connectivity and enhancing the capacity of the economies of landlocked developing countries, least developed countries and small island developing States through regional cooperation to meet emerging challenges, including the application of new technologies;

(d) Encouraging the participation of the private sector in developing cross-border broadband infrastructure, especially among landlocked developing countries, least developed countries and small island developing States and in areas where commercial viability has not yet been established;

(e) Ensuring that the Asia-Pacific information superhighway contributes to the achievement of various regional and international development goals and frameworks, such as the Sustainable Development Goals, the World Summit on the Information Society and the Programme of Action for the Least Developed Countries for the Decade 2011-2020;

(f) Capitalizing on intergovernmental platforms such as the Commission and the Committee on Information and Communications Technology, Science, Technology and Innovation for setting norms and

principles and building regional consensus, while promoting good practices and lessons learned and ensuring linkages with areas such as sustainable development, energy, transport, trade, statistics and social and economic development.

III. Norms and principles

4. The Regional Cooperation Framework Document is guided by the following norms and principles:

(a) The strategic initiatives for the Asia-Pacific information superhighway promote open and non-discriminatory access [1] to network infrastructure at fair and reasonable wholesale prices and service terms and conditions, in particular passive infrastructure,[2] and promote competition with a view to enhancing affordability and encouraging innovation;

(b) The Regional Cooperation Framework Document recognizes the importance in creating synergies between national, subregional and regional ICT initiatives;

(c) The Regional Cooperation Framework Document promotes cross-sectoral collaboration, such as co-deployment of optical fibre cables along Asian highways and railways, and adds value to existing mechanisms and partnerships in the area of ICT for development in general and ICT connectivity in particular.

IV. Areas of cooperation

5. The Master Plan provides guidance under strategic initiatives focusing on the four pillars: connectivity, traffic and network management, e-resilience and broadband for all. The implementation, coordination and monitoring of the initiatives will be guided by a steering committee. Based on the work completed by the Working Group on the Asia-Pacific Information Superhighway and its report to the seventy-third session of the Commission in 2017, it is proposed that this steering committee will assume the responsibilities established in the terms of reference once the Master Plan and the Regional Cooperation Framework Document have been endorsed by the Committee in October 2016. Supported by the secretariat and respective network corridors' focal points, the steering committee will oversee the implementation of activities, provide overall guidance and decide on priorities and directions, while advising on partnerships, potential funding opportunities and emerging technologies. The proposed terms of reference of the steering committee are attached as an annex to the Master Plan for the Asia-Pacific Information Superhighway (E/ESCAP/CICTSTI(1)/2).

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[1] According to the Best Practice Guidelines for Enabling Open Access, adopted by the 2010 Global Symposium for Regulators, open access is 'the possibility for third parties to use an existing network infrastructure". The scope of open access varies depending on the different extent of openness, from passive infrastructure and active infrastructure, to technology neutrality and network neutrality. But "there seems to be agreement that open access applies to infrastructure, and means that all suppliers are able to obtain access to network facilities on equal terms." (Quoted from 'ITU, Open access regulation in the digital economy')

[2] Passive infrastructure is non-electric infrastructure such as fibre-optic system facility, towers, poles, ducts, power supplies and co-location of terminal equipment.

6. The steering committee will report on the progress and challenges related to ICT connectivity in respective network corridors to the Committee on Information and Communications Technology, Science, Technology and Innovation through the secretariat. The Committee's report, including recommendations, will be submitted to the Commission at its subsequent session.

7. In this regard, stakeholders, including member countries, partners and the secretariat, will do the following:

(a) **Cross-border fibre-optic deployment and integration of the regional backbone network including passive infrastructure (initiative 1 of the Master Plan).** Taking into consideration the ICT initiatives and plans of subregional organizations,[3] United Nations agencies, the private sector and international financial institutions,[4] identify: (i) direct fibre-optic link (missing links); (ii) possible deployment of hybrid mesh and ring structure of resilient regional backbone networks; (iii) co-deployment of fibre optic cables along with the road, railway and energy networks to maximise cross-sectoral synergy; and (iv) the need for relevant studies, including in the area of data centres, cloud information-sharing and other affordable alternatives.

(b) **Establishment of Internet exchange points at national and subregional levels (initiative 2 of the Master Plan).** Identify areas of cooperation to: (i) establish regional, subregional and national Internet exchange points; (ii) set up operating principle and governance model of Internet exchange points and harmonize policy for the internet traffic management; and (iii) conduct studies.

(c) **Regional economic and social studies (initiative 3 of the Master Plan):** (i) conduct subregional and regional studies on the economic and social impacts of ICT and future ICT trends, including research and analysis on how to improve broadband affordability and inclusive broadband access and narrow the digital divide; (ii) conduct needs assessments of ICT development in ESCAP countries, taking into account the special needs and challenges of landlocked developing countries, least developed countries and small island developing States; (iii) conduct research on alternative broadband technologies; and (iv) conduct capacity-building on enhancing the productive use of broadband connectivity.

(d) **Enhancement of ICT infrastructure resilience in the Asia-Pacific region (initiative 4 of the Master Plan).** Given the importance of resilient ICT infrastructure to sustainable development and disaster risk reduction in the region, which is the most prone to natural disasters, explore ways to enhance e-resilience, including redundancy and diversification of routes; and integrate disaster management and emergency telecommunication components into ICT infrastructure design to enhance network diversity and resilience.

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[3] For example: the e-ASEAN Framework Agreement (2000); the memorandum of understanding between member countries for the Greater Mekong Subregion Information Superhighway (2004); recognition of the importance of ICT by member countries of the South Asian Association for Regional Cooperation through the creation of a working group on telecommunications and ICT (2004); the South Asia Subregional Economic Cooperation's Information Highway Project agreement (2007); the charter of the Organization of the Black Sea Economic Cooperation (1999); the declaration by the ministers of ICT of the member States of the Black Sea Economic Cooperation (2009); the Pacific digital strategy (2005); the Trans-Eurasian Information Super Highway; Trans-Asia-Europe and Trans-Europe-Asia; the Pacific Plan for Strengthening Regional Cooperation and Integration (revised version, 2007).

[4] Initiatives by the Asian Development Bank and the World Bank.

(e) **ICT-related regulations and policy frameworks (initiative 5 of the Master Plan)**: (i) encourage updating, harmonization and development of new ICT regulations and policy frameworks to create an enabling Internet ecosystem and foster a competitive market at national, subregional and regional levels; (ii) support and review national ICT preparedness towards cybersecurity; and (iii) support Internet Protocol version 6 preparedness.

(f) **Capacity-building (initiative 6 of the Master Plan).** Enhance individual and institutional capacity of member countries in areas of common interest, such as: (i) planning and management of Internet exchange points; (ii) network management and maintenance; (iii) network traffic management; (iv) sharing of best practices in network development and traffic management; (v) conduct technical training on the establishment of Internet service providers and cybersecurity; and (vi) enhancing knowledges through generation of new researches from an Asia-Pacific information superhighway academia network.

(g) **Funding (initiative 7 of the Master Plan):** (i) explore regional funding mechanisms for deployment of the Asia-Pacific information superhighway infrastructure; and (ii) collect information on ICT project funding mechanisms in the Asia-Pacific region.

(h) **Development of ICT applications for the digital economy and digital society.** Encourage development of ICT applications, services and contents for the achievement of the Sustainable Development Goals and more inclusive broadband access in collaboration with Governments, various United Nations agencies, international financial institutions, the private sector, think tanks, civil society and academia.

V. Financing mechanism

8. ICT infrastructure in the Asia-Pacific region has been developed and financed by Governments or the private sector as well as through various forms of public-private partnership cooperation model. As financing is a persistent challenge in developing ICT infrastructure in the region, various potential financing mechanisms for the Master Plan and Regional Cooperation Framework Document could be considered under the following modalities, among others, depending on the availability of funds and preferred modes of collaboration among the participating countries:

(a) **Project financing or special purpose vehicle model.** Private entities (potentially in collaboration with other types of stakeholders) can use special purpose vehicles to finance large infrastructure projects. Special purpose vehicles' operations are limited to the acquisition and financing of specific assets, and are usually set up as subsidiary companies with asset/liability structures and legal statuses that make their obligations secure even if one of the parent companies goes bankrupt. Given the evidence that there is an appetite for using special purpose vehicles for financing infrastructure development projects, it should be noted that the parameters of their use must be correctly examined.

(b) **Consortium model.** This model is probably the most commonly used in submarine cable ventures and could be used as a model for regional terrestrial connectivity. Private operators and groups team up into consortiums with a view to either owning international broadband access for their own operations or being able to offer competitive wholesale solutions. Capital costs are entirely borne by the consortium members, in accordance with their ownership agreement, usually referenced to a construction and maintenance agreement. Each member is allocated units of capacity in minimum investment units or minimum assignable units. A consortium rarely has a legal structure as it represents only a cost-sharing agreement where each member owns part of a major asset.

(c) **Management contract or build-operate-transfer.** Under this model, the public sector gives a private player the responsibility for deploying and operating the network on its behalf against annual fees or following a revenue-sharing agreement.

(d) **Donor financing.** Projects in developing countries are often supported by development financial institutions, which also provide guarantees for loans as well as direct financing or even, in some cases, equity contributions to projects proven to benefit the development of underserved countries or regions.

(e) **Vendor financing.** Financing from the equipment vendors for ICT infrastructure, in terms of providing credit for major equipment and supplies before the projects start generating revenues, can be a financing option worth considering in areas such as submarine cables and large mobile deployments, since such infrastructure investment is capital intensive and related cash inflows only start after the completion of the project. In cases where there is sufficient potential for profitable investments, such delaying of upfront capital commitments has the potential to expedite projects and supplement traditional funding mechanisms.

VI. Validity and update of the Asia-Pacific Information Superhighway Regional Cooperation Framework Document

9. The Regional Cooperation Framework Document aims to support the implementation of the Master Plan. Therefore, when the Master Plan is revised and updated, the Regional Cooperation Framework Document must be reviewed accordingly. The review will be initiated by the above-mentioned steering committee at its meeting to be held during the last year of implementation of the Master Plan, and any revision will be presented to the attention of the Committee on Information and Communications Technology, Science, Technology and Innovation for its endorsement.

10. The revision and review will take into account an evaluation of the effectiveness of this Regional Cooperation Framework Document, including the function of the steering committee, as well as technological advancement, requirements, emerging partnerships and financing opportunities for future implementation of the Asia-Pacific information superhighway.